

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference 257-Q-02-PCT	<b>FOR FURTHER ACTION</b>	See item 4 below
International application No. PCT/IL2007/001400	International filing date ( <i>day/month/year</i> ) 13 November 2007 (13.11.2007)	Priority date ( <i>day/month/year</i> ) 13 November 2006 (13.11.2006)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant Q-CORE LTD.		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 <i>bis</i> .1(a).																								
2.	This REPORT consists of a total of 10 sheets, including this cover sheet.																								
In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																									
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application	<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application
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4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44 <i>bis</i> .3(c) and 93 <i>bis</i> .1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44 <i>bis</i> .2).																								

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 19 May 2009 (19.05.2009)
Facsimile No. +41 22 338 82 70	Authorized officer  <div style="text-align: center; font-weight: bold;">Simin Baharlou</div>
e-mail: pt09.pct@wipo.int	

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
EYAL BRESSLER  
DR EYAL BRESSLER LTD  
LAZROM HOUSE 11 TUVAL ST.  
RAMAT GAN, ISRAEL 52522

PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing  
(day/month/year) **15 JUL 2008**

Applicant's or agent's file reference  
257-Q-02-PCT

**FOR FURTHER ACTION**  
See paragraph 2 below

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/IL07/01400

13 November 2007 (13.11.2007)

13 November 2006 (13.11.2006)

International Patent Classification (IPC) or both national classification and IPC

IPC: **F04B 43/08**( 2006.01);**F04B 43/12**( 2006.01);**F04B 45/06**( 2006.01)

USPC: 417/474,475,476,477.1-477.13

Applicant

Q-CORE LTD.

## 1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

## 3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Date of completion of this opinion

08 July 2008 (08.07.2008)

Authorized officer

Devon Kramer

Telephone No. 571-272-3700

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/IL07/01400

## Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:

☒ the international application in the language in which it was filed☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing☐ table(s) related to the sequence listing

b. format of material

☐ on paper☐ in electronic form

c. time of filing/furnishing

☐ contained in the international application as filed.☐ filed together with the international application in electronic form.☐ furnished subsequently to this Authority for the purposes of search.4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITYInternational application No.  
PCT/IL07/01400**Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty (N)

Claims 2, 4-17 YESClaims 1, 3 NO

Inventive step (IS)

Claims NONE YESClaims 1-17 NO

Industrial applicability (IA)

Claims 1-17 YESClaims NONE NO

## 2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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**Box No. VII Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

Claim 7 is objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof: Claim 7 states in line 3 "were this said fingers conduct," which does not make sense given the context.

Claim 12 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 12 is indefinite for the following reason(s): Claim 12 makes mention of a "large angular sweep" and then states "such as 87.5°". It is unclear whether the claim requires the angular sweep to be 87.5°.

Claim 14 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 14 is indefinite for the following reason(s): Claim 14 states "as defined in figures 2 and 3" and it is unclear how exactly the states are defined by the drawings. Applicant should describe the possible states in the claim using claim language.

Claim 15 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 15 is indefinite for the following reason(s): Claim 15 states "at the angular position per figure 4" and it is unclear what position in figure 4 is referred to. Applicant should describe the position in the claim using claim language.

Claim 16 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 16 is indefinite for the following reason(s): Claim 16 makes use of the phrases "is adapted to" and "to facilitate". It is unclear whether the limitations following these phrases are required by the claim as part of the invention.

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**Box No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claim 4 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 4 is indefinite for the following reason(s): Claim 4 discusses "said plurality of pressing-fingers" in line 1, but there is no antecedent basis for this terminology. It is therefore unclear what the term refers to.

Claim 5 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 5 is indefinite for the following reason(s): Claim 5 discusses "said balancing magnets" in line 1, but there is no antecedent basis for this terminology. It is therefore unclear what the term refers to.

Claim 6 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 6 is indefinite for the following reason(s): Claim 6 discusses "said balancing magnets" in line 1 and "the finger-type pressing members" in line 3, but there is no antecedent basis for this terminology. It is therefore unclear what these terms refer to.

Claim 7 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 7 is indefinite for the following reason(s): Claim 7 discusses "said pressing fingers" in line 1 and "said metal members" and "said magnets" in line 3, but there is no antecedent basis for this terminology. It is therefore unclear what these terms refer to.

Claim 8 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 8 is indefinite for the following reason(s): Claim 8 discusses "said magnetically balanced pressing-fingers" in line 1, but there is no antecedent basis for this terminology. It is therefore unclear what the term refers to.

Claim 12 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 12 is indefinite for the following reason(s): Claim 12 discusses "said fingers" in line 1 and "the shaft" in line 2, but there is no antecedent basis for this terminology. It is therefore unclear what these terms refer to.

Claim 15 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 15 is indefinite for the following reason(s): Claim 15 discusses "said cams" in line 1, but there is no antecedent basis for this terminology. It is therefore unclear what the term refers to.

Claim 17 is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claim 17 is indefinite for the following reason(s): Claim 17 discusses "said pump's" in line 3, but there is no antecedent basis for this terminology. It is therefore unclear what the term refers to.

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INTERNATIONAL SEARCHING AUTHORITY**

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**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

**V. 2. Citations and Explanations:**

1. Claims 1 and 3 lack novelty under PCT Article 33(2) as being anticipated by U.S. Patent 6,733,476 to Christenson et al. (Christenson et al.).

In Reference to Claim 1

Christenson et al. teach a peristaltic pump (see figure 1) comprising a plurality of effecters (rollers (58)), actuated in a periodic manner upon by obstructive forces of a flexible infusion tube (pump tube (14)) so as flow of infusion fluid is provided along said infusion tube, the magnitude of said obstructive forces being dependent upon the displacement of said moving effecters (the amount of force applied by the tube on to the rollers would naturally depend on the amount of force applied by the rollers to the tube); and a plurality of balancing magnets providing balancing forces upon one or all said moving effecters, said balancing forces at each point along the path of motion of the moving effecters being of approximately equal magnitude to that of said obstructive forces at said point (Christenson et al. teach the use of biasing members to ensure that the roller remains in contact with the pump tube (see column 9 lines 11-22). Furthermore, Christenson et al. disclose the use of magnetic members (see line 22) as biasing members. The force applied to the rollers by the tube would depend on the force of the biasing member.); such that the parasitic output due to work performed against said obstructive forces is approximately zero and yield is maximized (The purpose of the magnetic biasing components is to minimize the load required to occlude the tube, and therefore the force of the applied bias should be approximately equal to the resistance of the tube, and this would minimize parasitic output and maximize the yield of the pump.).

In Reference to Claim 3

Christenson et al. teach the magnetically balanced peristaltic pump according to claim 1, especially adapted to be utilized as ambulatory and hospital infusion pumps (see abstract, where pump is disclosed to be an infusion pump).

2. Claims 2, and 8-16 lack an inventive step under PCT Article 33(3) as being obvious over Christenson et al. in view of U.S. Patent 4,728,265 to Cannon (Cannon).

In Reference to Claim 2

Christenson et al. teach the finger-type peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers

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International application No.  
PCT/IL07/01400

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

(peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. The apparatus of Christenson et al. as modified by Cannon would still use magnetic biasing members to ensure that the fingers remain in contact with the pump tube (see column 9 lines 11-22 of Christenson et al.), and the force applied to the rollers by the tube would still depend on the force of the biasing member and therefore the force of the applied bias should be approximately equal to the resistance of the tube, and this would minimize parasitic output and maximize the yield of the pump.

In Reference to Claim 8

Christenson et al. teach the finger-type peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. The apparatus of Christenson et al. as modified by Cannon would still use magnetic biasing members to ensure that the fingers remain in contact with the pump tube (see column 9 lines 11-22 of Christenson et al.). The peristaltic fingers of Christenson et al. as modified by Cannon are actuated periodically by rotating cams ((44), see figure 3) to open and close sections of the tube (see figures 5 and 6). The purpose of the magnetic biasing components is to minimize the load required to occlude the tube

In Reference to Claim 9

Christenson et al. as modified by Cannon teach the peristaltic pump according to claim 8, wherein at least a portion of said magnetically balanced pressing-fingers actuated in at least partially non-linear movement (The force applied by the magnetic biasing components would be partially dependent upon the force of the tube and its liquid as well as the pressure inside the tube. Since the pressure inside the tube, especially at start up and shut down, is capable of being varied in a non-linear manner, the reactionary force applied by the magnetic balancing members would also vary in a non-linear manner.).

In Reference to Claim 10

Christenson et al. as modified by Cannon teach the peristaltic pump as defined in claim 8, wherein said magnetic balance prevent significant pressing forces build-up between said cam and said fingers along their entire forth and backwards linear movement (The springs (204) disclosed in the preferred embodiment of Christenson et al. act on the tube throughout the entire operation cycle of the pump, and any substituted magnetic assembly would act in the same way.).

In Reference to Claim 11

Christenson et al. as modified by Cannon teach the peristaltic pump as defined in claim 8 wherein the magnetic force is applied in one or more specific points along the circumference of the rotating cam (The spring bias mechanisms disclosed in the preferred embodiment of Christenson et al. (see figure 9) apply force to each roller at two specific locations along the top of each roller and any substituted magnetic assembly would act in the same way on the fingers of the apparatus of Christenson et al. as modified by Cannon, although only one magnetic bias mechanism may be needed for each finger.).

In Reference to Claim 12

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. The apparatus of Christenson et al. as modified by Cannon would use the cams (44) of Cannon to actuate the fingers (30), and because of the eccentric shape of the cam the fingers remain at maximum extension for a large angular sweep  $\Delta\theta$  of the shaft causing complete-tube shutoff during said large and predetermined range (see the cam (44) in figure 5 of Cannon).

In Reference to Claim 13

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. The apparatus of Christenson et al. as modified by Cannon would have a plurality of pressing fingers (see figure 3 of Cannon) with two alternating states of being either static or moving (or approaching to movement); in said static state said at least one finger is pressing said flexible infusion tube and at least one finger is withdrawn and not pressing said tube; in said moving state at least one finger is withdrawing from said tube and at least one finger is pressing the same (See figure 3 of Cannon where the fingers are staggered in such a manner that some of the fingers are withdrawing while others are pressing or about to press the tube.).

In Reference to Claim 14

Christenson et al. as modified by Cannon teach the peristaltic pump according to claim 13, wherein the static and moving states of said fingers per any given pumping cycle are as defined in figures 2 and 3 (each finger has a topmost position and a bottommost position (see figure 3 of Cannon), much like the states shown in figure 2.).

In Reference to Claim 15

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. The apparatus of Christenson et al. as modified by Cannon is characterized by one or more crescent forms (The upper and lower edges of the cam (44) of Cannon are crescent in shape), each of which of said crescent forms is



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INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IL07/01400

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

adapted to provide pressing of said finger by magnetic forces of said balancing magnets in the manner that said magnetic forces are at least slightly stronger than the oppositely directed elastic forces, provided by the squeezing of said flexible tube by said finger while shutting off said tube and by applying said magnetic force, complete tube's shut off is assured, especially in cases of worn out tubes and pumping mechanisms with noticeable tolerances (The magnetic biasing member of Christenson et al. minimizes the load required to occlude the tube by applying a force to the top of the rollers (404) that come into direct contact with the tube. When the apparatus of Christenson et al. is modified by Cannon, the rollers are replaced with pressing fingers, which are still biased by the magnetic members. The purpose of the magnetic biasing components is to minimize the load required to occlude the tube, and it would ensure that the fingers still contact and close the tube even when the components begin to wear out.).

In Reference to Claim 16

Christenson et al. as modified by Cannon teach the peristaltic pump according to claim 15, wherein at least a portion of said cams are characterized by a first and a second crescent forms located in opposite directions (The upper and lower edges of the cam (44) of Cannon are crescent in shape), said first crescent form is adapted to provide pressing of said finger by magnetic forces of said balancing magnets in the manner that said magnetic forces are at least slightly stronger than the oppositely directed elastic forces, provided by the squeezing of said flexible tube by said finger while shutting off said tube; by applying said magnetic force, complete tube's shut off is assured (The magnetic biasing member of Christenson et al. minimizes the load required to occlude the tube by applying a force to the top of the rollers (404) that come into direct contact with the tube. When the apparatus of Christenson et al. is modified by Cannon, the rollers are replaced with pressing fingers, which are still biased by the magnetic members. The purpose of the magnetic biasing components is to minimize the load required to occlude the tube, and it would ensure that the fingers still contact and close the tube even when the components begin to wear out.); said second crescent form is adapted to provide additional finger movement in the direction of withdrawing said tube, so as to facilitate a more relaxed form of mechanical pressure on the tube walls, especially in wider tubes, tubes of wider walls, and pumping mechanisms with noticeable tolerances; the said more relaxed form of mechanical pressure on the said tube enable a prolonged life of the tube and as a consequence a more accurate flow rate throughout the pumping (The shallower crescent form allows the tube to spring back into place by relaxing the pressure applied to the tube.).

3. Claims 4, 5, 6, and 7 lack an inventive step under PCT Article 33(3) as being obvious over Christenson et al. in view of Cannon and in further view of U.S. Patent Application Publication 2006/0051218 to Harttig (Hartig).

In Reference to Claim 4

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. However, the apparatus of Christenson et al. as modified by Cannon fails to teach that part of the magnetic balancer lies on the pressing finger while a separate part of the magnetic balancer lies on a stationary part of the fingers.

Hartig teaches another similar peristaltic style pump where the fingers (622, 624, 626) themselves are made out of magnetic material (see figure 8), and the fingers are actuated by magnets held on a moving rotor disc (630). It would have been obvious to one of ordinary skill in the art at the time of invention to form the pressing fingers of Christenson et al. as modified by Cannon out of a magnetic material as taught by Harttig in order to reduce the number of parts and ensure that the magnets could not be separated from the pressing fingers.

In Reference to Claim 5

Christenson et al. as modified by Cannon and Harttig teach the peristaltic pump according to claim 1, wherein at least a portion of said balancing magnets is located in the elongated body portion of the finger-type pressing members (fingers) (see figure 8 of Harttig where the fingers (622, 624, and 626) are made out of magnets.).

In Reference to Claim 6

Christenson et al. as modified by Cannon and Harttig teach the peristaltic pump according to claim 1, wherein at least a portion of said balancing magnets comprises metal (Hartig discloses that the magnets can be made of soft-iron) and other paramagnetic materials which are located in the finger-type pressing members (fingers) (see figure 8 of Harttig where the fingers (622, 624, and 626) are made out of magnets.).

In Reference to Claim 7

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. However, the apparatus of Christenson et al. as modified by Cannon fails to teach that part of the magnetic balancer lies on the pressing finger while a separate part of the magnetic balancer lies on a stationary part of the fingers.

Hartig teaches another similar peristaltic style pump where the fingers (622, 624, 626) themselves are made out of magnetic material (see figure 8), and the fingers are actuated by magnets held on a moving rotor disc (630). It would have been obvious to one of ordinary skill in the art at the time of invention to form the pressing fingers of Christenson et al. as modified by Cannon out of a magnetic material as taught by Harttig in order to reduce the number of parts and ensure that the magnets could not be separated from the pressing fingers.

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/IL07/01400

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

4. Claim 17 lacks an inventive step under PCT Article 33(3) as being obvious over Christenson et al. in view of Cannon and U.S. Patent 4,014,318 to Dockum et al. (Dockum et al.)

Christenson et al. teach the peristaltic pump according to claim 1, but do not teach that the effecters are pressing fingers.

Cannon teaches a similar peristaltic pump where the tube (IV tube (16)) lies flat and is actuated by a plurality of pressing fingers (peristaltic fingers (30)) instead of rollers. It would have been obvious to one of ordinary skill in the art at the time of invention to actuate the tube of Christenson et al. with pressing fingers as taught by Cannon in order to allow the tube to lie flat, and in order to ensure a more accurate delivery of fluid. However, the apparatus of Christenson et al. as modified by Cannon fails to teach that the pressing fingers have a rounded cross section, or that a sealing means forms a hermetic barrier around the fingers.

Dockum et al. teach a magnetically operated plunger pump (see figure 1) where the plunger (156) has a slightly rounded cross section along the edge that contacts the tube (148). It would have been obvious to one of ordinary skill in the art at the time of invention to round the edge of the pressing fingers of Christenson et al. as modified by Cannon in order to concentrate the pressing force along a single area of the tube to ensure that the tube is truly closed off.

Dockum et al. also teach the use of a gasket (32) or other appropriate sealing means to form a seal between the interior and exterior of the housing so that no fluid can enter the dry pump housing. It would have been obvious to one of ordinary skill in the art at the time of invention to include a seal between the interior and exterior of the housing of Christenson et al. as modified by Cannon in order to ensure that the inner workings of the pump apparatus remain clean and dry.

5. Claims 1-17 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.